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### C L A I M S

1. A high-resolution magnetic encoder system (2), comprising a magnetic resistive sensor (4) mounted on a fixed suspension (6) above a magnetic medium (10), said suspension (6) being attached to a substrate (8) or a housing (22), and said magnetic medium (10) carrying at least one magnetic track (16), wherein said sensor (4) is adapted to perform a relative movement with respect to and in close contact to the surface of said magnetic medium (10), which is protected by a overcoat layer (20).

2. Magnetic encoder system according to claim 1, wherein said magnetic media (10) is a magnetic layer (14) deposited on a rotating disk (12).

3. Magnetic encoder system according to claim 1 or 2, wherein said overcoat layer (20) is selected from the group consisting of layers of DLC,  $C_xN_y$ ,  $BN_x$ , cBN,  $B_xC_y$ ,  $B_x-C_y-N_z$  gradient layer,  $SiN_x$ , SiC, TiN, WC,  $AlO_x$  and the like.

4. Magnetic encoder system according to any one of claims 1 to 3, wherein said substrate (8) is an electronic board.

5. Magnetic encoder system according to any one of the preceding claims, wherein said magnetic sensor is a read/write magnetic head.

6. Magnetic encoder system according to any one of the preceding claims, wherein said magnetic sensor (4) is a GMR or a TMR sensor.

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7. Magnetic encoder system according to any one of the preceding claims, wherein the system is encapsulated.

8. Magnetic encoder system according to any one of the preceding claims, wherein said magnetic media (10) is a planar disk carrying magnetic encoder features that can be read out by a magnetic read sensor (36).

9. Method of forming a high-resolution magnetic encoder system (2), wherein a magnetic sensor (4) is mounted on a fixed suspension (6) above a magnetic media (10), said suspension (6) being attached to a substrate (8), and wherein said sensor (4) performs a relative movement with respect to and in close contact to the surface of said magnetic media (10), said magnetic media (10) being protected by a hard cover layer (20).

10. Method for fabricating a magnetic encoder disk (10), comprising the steps of

- providing a servo pattern (24) in a contact stencil mask (26);
- transferring said servo pattern (24) into a latent magnetic pattern in the magnetic coating of said encoder disk (10) by ion irradiation (30); and
- activating said latent magnetic pattern by applying a magnetic field saturating the full disk (10) in one direction, and subsequently applying a counter magnetizing field, thereby reversing the features irradiated through said mask (26).

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11. Method according to claim 10, wherein said reversed features are read out by a magnetic read sensor (36) in contact with said magnetic encoder disk (10).